test speed at the maximum in-use engine speed instead of the speed specified in § 94.107(d).

[64 FR 73331, Dec. 29, 1999, as amended at 68 FR 9784, Feb. 28, 2003; 70 FR 40458, July 13, 2005]

§ 94.108 Test fuels.

(a) *Distillate diesel test fuel.* (1) The diesel fuels for testing Category 1 and Category 2 marine engines designed to operate on distillate diesel fuel shall be clean and bright, with pour and cloud points adequate for operability. The diesel fuel may contain nonmetallic additives as follows: cetane improver, metal deactivator, antioxidant, dehazer, antirust, pour depressant, dye, dispersant, and biocide. The diesel fuel shall also meet the specifications (as determined using methods incorporated by reference at § 94.5) in Table B–5 of this section, or substantially equivalent specifications approved by the Administrator, as follows:

TABLE B–5—FEDERAL TEST FUEL SPECIFICATIONS

Item	Procedure [1]	Value
Cetane	ASTM D 613–01	40–48
Distillation Range:		
Initial boiling point, °C	ASTM D 86–01	171–204
10% point, °C	ASTM D 86–01	204–238
50% point, °C	ASTM D 86–01	243–282
90% point, °C	ASTM D 86–01	293–332
End point, °C	ASTM D 86–01	321–366
Flashpoint, °C	ASTM D 93–02	54 minimum
Gravity, API	ASTM D 287–92	32–37
Hydrocarbon composition:		
Aromatics, volume percent	ASTM D 1319–02a or D 5186–99	10 minimum
Olefins and Saturates (paraffins and napththenes).	ASTM D 1319–02a	Remainder
Total Sulfur, weight percent	ASTM D 129–00 or D 2622–98	0.03–0.80
Viscosity at 38 °C, centistokes	ASTM D 445–01	2.0–3.2

[1] All ASTM standards are incorporated by reference in § 94.5.

(2) Other diesel fuels may be used for testing provided:

(i) They are commercially available; and

(ii) Information, acceptable to the Administrator, is provided to show that only the designated fuel would be used in service; and

(iii) Use of a fuel listed under paragraph (a)(1) of this section would have a detrimental effect on emissions or durability; and

(iv) Written approval from the Administrator of the fuel specifications is provided prior to the start of testing.

(3) The specification of the fuel to be used under paragraphs (a)(1), and (a)(2) of this section shall be reported in the application for certification.

(4) Manufacturers may perform testing using the low-sulfur diesel test fuel or the ultra low-sulfur diesel test fuel specified in 40 CFR part 1065.

(b) *Other fuel types.* For Category 1 and Category 2 engines that are designed to be capable of using a type of fuel (or mixed fuel) instead of or in addition to distillate diesel fuel (*e.g.*, natural gas, methanol, or nondistillate diesel), and that are expected to use that type of fuel (or mixed fuel) in service:

(1) A commercially available fuel of that type shall be used for exhaust emission testing. The manufacturer shall propose for the Administrator's approval a set of test fuel specifications that take into account the engine design and the properties of commercially available fuels. The Administrator may require testing on each fuel if it is designed to operate on more than one fuel. These test fuel specifications shall be reported in the application for certification.

(2) [Reserved]

(c) *Service accumulation fuel.* Fuel used for service accumulation shall be representative of the typical fuel expected to be used by the engines in service.

(d) *Correction for sulfur*—(1) *High sulfur fuel.* (i) Particulate emission measurements from Category 1 or Category

2 engines without exhaust aftertreatment obtained using a diesel fuel containing more than 0.40 weight percent sulfur may be adjusted to a sulfur content of 0.40 weight percent.

(ii) Adjustments to the particulate measurement for using high sulfur fuel shall be made using the following equation:

$PM_{adj}=PM-[BSFC \times 0.0917 \times (FSF-0.0040)]$

Where:
PM_{adj}=adjusted measured PM level [g/kW-hr]
PM=measured weighted PM level [g/kW-hr]
BSFC=measured brake specific fuel consumption [g/kW-hr]
FSF=fuel sulfur weight fraction

(2) *Low sulfur fuel.* (i) Particulate emission measurements from Category 1 or Category 2 engines without exhaust aftertreatment obtained using diesel fuel containing less than 0.03 weight percent sulfur shall be adjusted to a sulfur content of 0.20 weight percent.

(ii) Adjustments to the particulate measurement for using ultra low-sulfur fuel shall be made using the following equation:

$PM_{adj}=PM+[BSFC \times 0.0917 \times (0.0020-FSF)]$

Where:
PM_{adj}=adjusted measured PM level [g/kW-hr]
PM=measured weighted PM level [g/kW-hr]
BSFC=measured brake specific fuel consumption [g/kW-hr]
FSF=fuel sulfur weight fraction

(e) *Test fuel for Category 3 engines.* For testing Tier 1 engines, use test fuels meeting the specifications listed in the Annex VI Technical Code (incorporated by reference in §94.5).

[64 FR 73331, Dec. 29, 1999, as amended at 67 FR 68345, Nov. 8, 2002; 68 FR 9784, Feb. 28, 2003; 73 FR 37196, June 30, 2008]

§94.109 Test procedures for Category 3 marine engines.

(a) Gaseous emissions shall be measured using the test cycles and procedures specified by Section 5 of the Annex VI Technical Code (incorporated by reference in §94.5), except as otherwise specified in this paragraph (a).

(1) The inlet air and exhaust restrictions shall be set at the average in-use levels.

(2) Measurements are valid only for sampling periods in which the temperature of the charge air entering the engine is within 3 °C of the temperature that would occur in-use under ambient conditions (temperature, pressure, and humidity) identical to the test conditions. You may measure emissions within larger discrepancies, but you may not use those measurements to demonstrate compliance.

(3) Engine coolant and engine oil temperatures shall be equivalent to the temperatures that would occur in-use under ambient conditions identical to the test conditions.

(4) Exhaust flow rates shall be calculated using measured fuel flow rates.

(5) Standards used for calibration shall be traceable to NIST standards. (Other national standards may be used if they have been shown to be equivalent to NIST standards.)

(6) Certification tests may be performed at any representative pressure and humidity levels. Certification tests may be performed at any ambient air temperature from 13 °C to 30 °C and any charge air cooling water temperature from 17 °C to 27 °C. These limits apply instead of the limits specified in section 5.2.1 of the Annex VI Technical Code. Correct emissions for test conditions using the corrections specified in section 5.12.3 of the Annex VI Technical Code.

(7) Test cycles shall be denormalized based on the maximum test speed described in §94.107.

(b) Analyzers meeting the specifications of either 40 CFR part 1065, subpart C, or ISO 8178–1 (incorporated by reference in §94.5) shall be used to measure THC and CO.

(c) The Administrator may specify changes to the provisions of paragraph (a) of this section that are necessary to comply with the general provisions of §94.102.

[68 FR 9785, Feb. 28, 2003, as amended at 70 FR 40458, July 13, 2005]

Subpart C—Certification Provisions

§94.201 Applicability.

(a) The requirements of this subpart are applicable to manufacturers of engines subject to the standards of subpart A of this part.